

# CLAIM AMENDMENTS

## Claim Amendment Summary

### **Claims pending**

- At time of the Action: Claims 1-35, 37-40, and 42-52.
- After this Response: Claims 1-35, 37-40, and 42-56.

**Canceled or Withdrawn claims:** none.

**Amended claims:** 1-6, 13, 19-24, 27, 28, 30, 37, 42-45, and 46-52.

**New claims:** 53-56.

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### **Claims:**

1. **(CURRENTLY AMENDED)** A method for measuring bandwidth between two entities on a dynamic network, the method comprising:

via a dynamic network, receiving at least ~~one~~ ~~first~~ a pair of non-compressible ~~packet~~ packets having measurable characteristics, the dynamic network being a communications network having no assurance that both packets of a pair of identical packets are handled in an identical manner while in transit on the communications network;

calculating bandwidth based upon, ~~at least partially,~~ measurable characteristics of at least the first pair of non-compressible packet packets.

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1           2.     **(CURRENTLY AMENDED)** A method as recited in claim 1, wherein  
2     the first each of the pair of non-compressible packet packets is approximately  
3     fragmentation-avoidance size.

4  
5           3.     **(CURRENTLY AMENDED)** A method as recited in claim 1, wherein  
6     the first each of the pair of non-compressible packet packets is highly entropic.

7  
8           4.     **(CURRENTLY AMENDED)** A method as recited in claim 1, wherein t  
9     the first each of the pair of non-compressible packet packets is formatted for TCP.

10  
11          5.     **(CURRENTLY AMENDED)** A method as recited in claim 1, wherein  
12     the first each of the pair of non-compressible packet packets is formatted for UDP.

1           6. (CURRENTLY AMENDED) A method as recited in claim 1, wherein  
2 further comprising:

3                 ~~after receiving the first packet, receiving a second received packet of the~~  
4                 ~~pair~~ non-compressible packet having measurable characteristics including a packet  
5                 size (PS) and a time of receipt (t<sub>3</sub>);

6                 wherein the measurable characteristics of the ~~a~~ first received packet include  
7                 a packet size, which is equivalent to the packet size of the second received packet,  
8                 and a time of receipt (t<sub>1</sub>);

9                 wherein a bandwidth (bw) is calculated, during the calculating, by this  
10                 formula:

$$12 \quad bw = \frac{PS}{t_3 - t_1}$$

13

14 .

15

16           7. (ORIGINAL) A method as recited in claim 1 further comprising  
17                 querying a modem of an entity about a bandwidth setting of the modem when  
18                 result of calculating bandwidth is outside a given range of believability.

19

20           8. (ORIGINAL) A method as recited in claim 1 further comprising  
21                 storing result of calculating bandwidth within a list of recent bandwidth  
22                 measurements.

1           9.     **(ORIGINAL)** A method as recited in claim 1 further comprising:  
2               storing result of calculating bandwidth within a list of recent bandwidth  
3               measurements;

4               finding a statistical derivation from such list, such derivation representing a  
5               most likely actual bandwidth between the two entities.

6

7           10.   **(ORIGINAL)** A method as recited in claim 1 further comprising:  
8               storing result of calculating bandwidth within a list of recent bandwidth  
9               measurements;

10              finding a median of such list, such median representing a most likely actual  
11               bandwidth between the two entities.

12

13           11.   **(ORIGINAL)** A program module having computer-executable  
14               instructions that, when executed within a computing operating environment at an  
15               application layer, performs the method as recited in claim 1.

16

17           12.   **(ORIGINAL)** A computer-readable medium having computer-  
18               executable instructions that, when executed by a computer, performs the method  
19               as recited in claim 1.

1           **13. (CURRENTLY AMENDED)** A method for measuring bandwidth  
2 between two entities on a dynamic network, the method comprising:

3           via a dynamic network, receiving a first non-compressible packet and a  
4 second non-compressible packet, the dynamic network being a communications  
5 network having no assurance that both packets of a pair of identical packets are  
6 handled in an identical manner while in transit on the communications network;

7           ~~receiving a second non-compressible packet;~~

8           calculating bandwidth based upon the relative timing of the receiving of the  
9 first and second non-compressible packets.

10  
11           **14. (PREVIOUSLY PRESENTED)** A method as recited in claim 13,  
12 wherein bandwidth (bw) is calculated, during the calculating, by this formula:

13  
14           bw = 
$$\frac{\text{PS}}{t_3 - t_1}$$

15  
16           where

- 17  
18           • PS is packet size of the first and second non-compressible packet;  
19           •  $t_3$  is a time of receipt of the second packet;  
20           •  $t_1$  is a time of receipt of the first packet.

21           **15. (ORIGINAL)** A method as recited in claim 13, wherein the first and  
22 second non-compressible packets are approximately fragmentation-avoidance size.

1           16. (**ORIGINAL**) A method as recited in claim 13, wherein the first and  
2 second non-compressible packets are highly entropic.

3  
4           17. (**ORIGINAL**) A method as recited in claim 13, wherein the first and  
5 second non-compressible packets are formatted for TCP.

6  
7           18. (**ORIGINAL**) A method as recited in claim 13, wherein the first and  
8 second non-compressible packets are formatted for UDP.

9  
10          19. (**CURRENTLY AMENDED**) A method for measuring bandwidth  
11 between two entities on a dynamic network, the method comprising:

12           via a dynamic network, sending at least one first a pair of non-compressible  
13 packet packets, the dynamic network being a communications network having no  
14 assurance that both packets of a pair of identical packets are handled in an  
15 identical manner while in transit on the communications network;

16           receiving a bandwidth calculation based upon, ~~at least partially,~~  
17 measurements related to at least the first pair of non-compressible packet packets.

18  
19          20. (**CURRENTLY AMENDED**) A method as recited in claim 19, wherein  
20 the first each of the pair of non-compressible packet packets is approximately  
21 fragmentation-avoidance size.

1           **21. (CURRENTLY AMENDED)** A method as recited in claim 19, wherein  
2        the first each of the pair of non-compressible packet packets is highly entropic.

3

4           **22. (CURRENTLY AMENDED)** A method as recited in claim 19, wherein  
5        the first each of the pair of non-compressible packet packets is formatted for TCP.

6

7           **23. (CURRENTLY AMENDED)** A method as recited in claim 19, wherein  
8        the first each of the pair of non-compressible packet packets is formatted for UDP.

9

10          **24. (CURRENTLY AMENDED)** A method as recited in claim 19 ~~further comprising sending a second non-compressible packet immediately after sending the first packet and before receiving a bandwidth calculation~~, wherein the ~~first and second packets of the pair~~ are equivalent in size.

11

12          **25. (ORIGINAL)** A method as recited in claim 19, after the receiving,  
13        further comprising:

14

15              selecting a file formatted for a given bandwidth that is equal to or less than  
16        the bandwidth calculation;

17

18              sending such file.

1           **26. (ORIGINAL)** A method as recited in claim 19, after the receiving,  
2 further comprising:

3                 selecting a subfile formatted for a given bandwidth that is equal to or less  
4 than the bandwidth calculation;

5                 sending such subfile.

6

7           **27. (CURRENTLY AMENDED)** A method as recited in claim 19, before  
8 the sending, further comprising selecting ~~the first one of the pair of~~ non-  
9 compressible ~~packet~~ packets from a set of differing non-compressible packets.

10

11          **28. (CURRENTLY AMENDED)** A method as recited in claim 19, before  
12 the sending, further comprising generating ~~the first~~ the pair of non-compressible  
13 ~~packet~~ packets.

1           **29. (ORIGINAL)** A computer-readable medium having computer-  
2 executable instructions that, when executed by a computer, performs the method  
3 as recited in claim 19.

4

5           **30. (CURRENTLY AMENDED)** A method for measuring bandwidth  
6 between two entities on a dynamic network, the method comprising:

7                 via a dynamic network, sending a first non-compressible packet, the  
8 dynamic network being a communications network having no assurance that both  
9 packets of a pair of identical packets are handled in an identical manner while in  
10 transit on the communications network;

11                 via the dynamic network, sending a second non-compressible packet  
12 immediately after the sending of the first packet.

13

14           **31. (ORIGINAL)** A method as recited in claim 30 further comprising  
15 receiving a bandwidth calculation based upon measurements related to the first  
16 and second non-compressible packets.

17

18           **32. (ORIGINAL)** A method as recited in claim 30, wherein the first and  
19 second non-compressible packets are approximately fragmentation-avoidance size.

1           33. **(ORIGINAL)** A method as recited in claim 30, wherein the first and  
2 second non-compressible packets are highly entropic.

3  
4           34. **(ORIGINAL)** A method as recited in claim 30, wherein the first and  
5 second non-compressible packets are formatted for TCP.

6  
7           35. **(ORIGINAL)** A method as recited in claim 30, wherein the first and  
8 second non-compressible packets are formatted for UDP.

9  
10          36. **(CANCELED)**

11  
12          37. **(CURRENTLY AMENDED)** A method of approximating a bandwidth  
13 between two entities on a network, the method comprising:

14           generating a list of entries, each entry containing a recent bandwidth  
15 measurement;

16           each measurement being based upon a Packet-Pair bandwidth calculation of  
17 different pairs of packets, wherein a pair of packets differs from another pair of  
18 packets in objectively measurable characteristics.

19  
20          38. **(ORIGINAL)** A method as recited in claim 37 further comprising  
21 replacing a measurement in an entry with a most recently calculated measurement.

1           **39. (ORIGINAL)** A method as recited in claim 37, wherein the packets,  
2 which are the basis for the Packet-Pair bandwidth calculation, are non-  
3 compressible.

4  
5           **40. (ORIGINAL)** A method as recited in claim 37, wherein the packets,  
6 which are the basis for the Packet-Pair bandwidth calculation, are highly entropic.

7  
8           **41. (CANCELED)**

9  
10          **42. (CURRENTLY AMENDED)** A computer-readable medium having  
11 stored thereon a data structure, comprising:

12           a list of entries, each entry being a recent bandwidth measurements;  
13           each entry being based upon a Packet-Pair bandwidth calculation of  
14 different pairs of packets, wherein a pair of packets differs from another pair of  
15 packets in objectively measurable characteristics.

1           **43. (CURRENTLY AMENDED)** A computer-readable medium having  
2 computer-executable instructions that, when executed by a computer, perform a  
3 method to measure bandwidth between two entities on a dynamic network, the  
4 method comprising:

5           via a dynamic network, receiving a first non-compressible packet and a  
6 second non-compressible packet, the dynamic network being a communications  
7 network having no assurance that both packets of a pair of identical packets are  
8 handled in an identical manner while in transit on the communications network;

9           receiving a second non-compressible packet;

10          calculating bandwidth based upon the relative timing of the receiving of the  
11 first and second non-compressible packets.

12  
13          **44. (CURRENTLY AMENDED)** A computer-readable medium having  
14 computer-executable instructions that, when executed by a computer, perform a  
15 method to measure bandwidth between two entities on a dynamic network, the  
16 method comprising:

17           via a dynamic network, sending a first non-compressible packet, the  
18 dynamic network being a communications network having no assurance that both  
19 packets of a pair of identical packets are handled in an identical manner while in  
20 transit on the communications network;

21           via the dynamic network, sending a second non-compressible packet  
22 immediately after the sending of the first packet.

1           **45. (CURRENTLY AMENDED)** A computer-readable medium having  
2 computer-executable instructions that, when executed by a computer, perform a  
3 method to approximate a bandwidth between two entities on a network, the  
4 method comprising:

5           generating a list of entries, each entry containing a recent bandwidth  
6 measurement;

7           each measurement being based upon a Packet-Pair bandwidth calculation of  
8 different pairs of packets, wherein a pair of packets differs from another pair of  
9 packets in objectively measurable characteristics.

10  
11          **46. (CURRENTLY AMENDED)** A modulated data signal having data  
12 fields encoded thereon transmitted over a dynamic communications channel,  
13 comprising:

14           a first packet containing non-compressible data;  
15           a second packet following the first packet, the second packet containing  
16 non-compressible data,

17           wherein a dynamic communications channel being a communications  
18 network having no assurance that both packets of a pair of identical packets are  
19 handled in an identical manner while in transit on the communications network.

20  
21          **47. (CURRENTLY AMENDED)** The modulated ~~data signals~~ data signal as  
22 recited in claim 46, wherein the first and second packets are approximately  
23 fragmentation-avoidance size.

1           **48. (CURRENTLY AMENDED)** The modulated ~~data signals~~ data signal as  
2 recited in claim 46, wherein the first and second packets are highly entropic.

3

4           **49. (CURRENTLY AMENDED)** The modulated ~~data signals~~ data signal as  
5 recited in claim 46, wherein the first and second packets are formatted for TCP.

6

7           **50. (CURRENTLY AMENDED)** The modulated ~~data signals~~ data signal as  
8 recited in claim 46, wherein the first and second packets are formatted for UDP.

9

10          **51. (CURRENTLY AMENDED)** An apparatus comprising:  
11           a processor;  
12           a network interface configured to be linked to a dynamic network, the  
13           dynamic network being a communications network having no assurance that both  
14           packets of a pair of identical packets are handled in an identical manner while in  
15           transit on the communications network;

16           a bandwidth measurer executable on the processor to:

17           receive a first non-compressible packet via the network interface  
18           linked to a dynamic network, the first non-compressible packet having  
19           measurable characteristics;

20           receive a second non-compressible packet via the network interface  
21           linked to a dynamic network, the second non-compressible packet having  
22           measurable characteristics;

23           calculate bandwidth based upon measurable characteristics of the  
24           first and second non-compressible packets.

1           **52. (CURRENTLY AMENDED)** An apparatus comprising:

2           a processor;

3           a network interface configured to be linked to a dynamic network, the  
4           dynamic network being a communications network having no assurance that both  
5           packets of a pair of identical packets are handled in an identical manner while in  
6           transit on the communications network;

7           a bandwidth measurer executable on the processor to:

8           ~~sending a first non-compressible packet;~~

9           ~~sending a second non-compressible packet immediately following~~  
10           ~~the sending of the first packet.~~

11           send a first non-compressible via the network interface linked to a  
12           dynamic network;

13           via the network interface linked to the dynamic network, send a  
14           second non-compressible packet immediately after the first packet is sent.

1           **53. (NEW)**     A method as recited in claim 1, wherein the dynamic  
2 network is the Internet.

3

4           **54. (NEW)**     A method as recited in claim 13, wherein the dynamic  
5 network is the Internet.

6

7           **55. (NEW)**     A method as recited in claim 19, wherein the dynamic  
8 network is the Internet.

9

10          **56. (NEW)**     A method as recited in claim 30, wherein the dynamic  
11 network is the Internet.